

Patent

Attorney Docket No.: 12553/130

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT : Naoto MATONO
SERIAL NO. : 10/802,596
FILING DATE : March 16, 2004
FOR : A METHOD FOR MANUFACTURING
A MAGNETIC HEAD
ART UNIT : 3729
EXAMINER : Anthony D. TUGBANG

M/S: APPEAL BRIEF – PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

ATTENTION: Board of Patent Appeals and Interferences

APPEAL BRIEF

Dear Sir:

This brief is in furtherance of the Notice of Appeal, filed in this case on September 15,
2008.

1. REAL PARTY IN INTEREST

The real party in interest in this matter is SAE Magnetics (H.K.). (Recorded October 7, 2002; Reel/Frame 013368 / 0840).

2. RELATED APPEALS AND INTERFERENCES

There are no related appeals.

3. STATUS OF THE CLAIMS

Claims 9-16 are pending and rejected. Claims 1-8, 12 and 16-24 were previously cancelled without prejudice or disclaimer. No claims are withdrawn, objected to, or allowed. No amendments to the claims were made after the Final Office Action of May 16, 2008.

The claims in their current form (including those claims under appeal) are presented in The Appendix – Section 8 – Claims on Appeal.

4. STATUS OF AMENDMENTS

The claims listed on page A-1 of the Appendix attached to this Appeal Brief reflects the present status of the claims.

5. SUMMARY OF THE CLAIMED SUBJECT MATTER

The present invention relates generally to a thin film magnetic head having an inductive magnetic transducer for writing and a method of manufacturing the same.

The embodiment of independent claim 9 generally describes a method of manufacturing a thin film magnetic head comprising: providing first (*e.g.*, page 12, lines 21-24 – Figures 3A-B, 13) and second magnetic layers *e.g.*, page 9, lines 10-11 – Figures 1A-B, 7) magnetically coupled to each other and having first *e.g.*, page 12, lines 21-24 – Figures 3A-B, 13A) and second pole tip portions (*e.g.*, page 13, lines 15-17 – Figures 4A-B, 7P) placed so as to face a recording medium in conjunction with being in contact with a gap layer (*e.g.*, page 11, lines 19-21 – Figures 2A-B, 12) and being opposed to each other as sandwiching the gap layer; providing a thin film coil disposed in a space between the first and second magnetic layers (*e.g.*, page 12, lines 21-24 – Figures 3A-B, 13); and providing a first insulating layer (*e.g.*, page 11, lines 20-24 – Figures 2A-B, 10), sandwiched between a second (*e.g.*, page 11, lines 20-24 – Figures 2A-B, 8) and a third insulating layer (*e.g.*, page 11, lines 20-24 – Figures 2A-B, 11), embedding the thin film coil in the space between the first and second magnetic layers, providing a trim structure comprising a portion of the first magnetic layer and a portion of the second magnetic layer in direct contact with a portion of the gap layer (*e.g.*, page 13, lines 10-15 – Figures 4A-B, 100); wherein the method further comprises forming the gap layer with a non-magnetic conductive material (*e.g.*, page 16, lines 20-25 – Figures 6A-B, 12); and forming at least the first pole tip portion on the gap layer by growing a plating film with the gap layer used as an electrode and wherein the first magnetic layer including the first pole tip portion is formed of the plating film as a single layer (*e.g.*, page 17, lines 1-10 – Figures 12A-B).

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Are claims 9 and 13 rendered obvious under 35 U.S.C. § 103(a) over Santini, U.S. Patent No. 6, 130,809 (hereinafter “Santini”), in view of Japanese Patent Publication No. JP 60-72249, (hereinafter “JP ‘249”)?

B. Are claims 10 and 14 rejected under 35 U.S.C. § 103(a) rendered obvious over Santini further in view of Armstrong et al., (hereinafter “Armstrong”), U.S. Patent No. 5,901,432?

C. Are claims 11 and 15 rendered obvious under 35 U.S.C. § 103(a) unpatentable over Santini in view of Chen et al., (hereinafter “Chen”), U.S. Patent No. 5,652,687, and further in view of Jones, U.S. Patent No. 4,337,132 (hereinafter “Jones”)?

7. ARGUMENT

A. Claims 9 and 13 rejected are not rendered obvious over Santini and JP ‘249.

Applicants maintain the cited references do not teach or suggest at least a trim structure comprising a portion of a first magnetic layer and a portion of a second magnetic layer in direct contact with a portion of a gap layer (*e.g.*, as described in claim 9). *See also e.g.*, Figs. 4B, 5B, 6B.

At least these features are absent from the cited references for at least the following reasons. Santini fails to describe at least this limitation. *See e.g.*, cited Figure 24. The remaining Figures of Santini fail to describe such limitations as well. Chen also fails to describe at least this limitation. *See* cited Figure 7. The remaining Figures of Chen fail to describe such limitations as well. Armstrong and Jones fail to make up for the deficiencies of Chen, and Santini as well. Although these references are generally directed toward producing a magnetic

read/write heads, they fail to teach, suggest or describe at least providing a trim structure comprising a portion of a first magnetic layer and a portion of a second magnetic layer in direct contact with a portion of a gap layer.

The Examiner asserts Santini teaches a trim structure, citing TW of P1 in Figure 21. *See* Office Action dated 5/16/2008, paragraph 3. Applicants disagree. Santini describes TW as the “track width”. *See e.g.*, column 11, lines 50-54 (“A first pole tip 230 is located on the front component of the first pole piece layer and has a width at the ABS which defines the track width (TW) of the write head, as shown in FIGS. 20 and 21.”). Contrary to the Examiner’s assertions, there is no assertion that the TW “track width” in the cited reference is describing any structure that would be similar to the relevant trim structure of embodiments of the present application. For example, the following sections represent the totality of the description of the cited “track width” of Santini:

“A first pole tip 230 is located on the front component of the first pole piece layer and has a width at the ABS which defines the track width (TW) of the write head, as shown in FIGS. 20 and 21.” *See* column 11, 50-54.

“The front component 258 extends to the ABS and the first pole tip 262 is constructed thereon. The front component 258 and the first pole tip 262 have the same width which defines the track width (TW) of the head.” *See* column 12, lines 51-55.

“The top first pole tip 304 defines the track width (TW) of the head, as shown in FIGS. 26-28.” *See* column 13, lines 18-20.

Applicants submit one of skill in the art readily understands a track width is not the same as a trim structure comprising a portion of a first magnetic layer and a portion of a second magnetic

layer in direct contact with a portion of a gap layer (*e.g.*, as described in claim 9). Therefore, the current rejection is lacking. In view of the above, Appellants respectfully submit that the rejection of claims 9-11 and 13-15 should be reversed.

B. Claims 10 and 14 rejected are not rendered obvious over Santini, JP ‘249, and further in view of Armstrong.

JP ‘249 fails to make up for deficiencies of Santini. It is directed to blocking the stripping of a bump by providing sufficient coating of a bump end by accurate patterning a photo resist, and to make it serve as a protection film by forming a polyimide film. It does not describe at least the relevant aspects of the method of claim 9 discussed above.

Similarly, Armstrong fails to make up for the deficiencies of Santini as well. It is directed a method for making a merged thin film read/write head, where the first pole piece includes a pedestal or pole tip portion that extends up from the first pole piece layer, uses electroplating to form the gap so that the gap layer does not have to be removed later. It is not directed to a trim structure comprising a portion of a first magnetic layer and a portion of a second magnetic layer in direct contact with a portion of a gap layer (*e.g.*, as described in claim 9).

Therefore, since both the references fail to teach or suggest at least these relevant limitations of claim 9, Applicants submit claim 9 is allowable; claims 10 and 14 are allowable for depending from an allowable base claim.

C. Claims 11 and 15 rejected are not rendered obvious over Santini, Chen, and further in view of Jones.

Chen is directed to a thin film magnetic write head is provided with a notch structure located on top of one of two pole layers; the structure is utilized to avoid saturation. However, similar to the above-cited references, the cited reference does not teach or suggest at least the relevant limitations of claim 9 discussed above.

Jones is directed to minimizing redeposition of thin film material being removed by ion impact via a patterned resist mask. It also does not describe the relevant limitations of claim 9.

Therefore, since both the references fail to teach or suggest at least these relevant limitations of claim 9, Applicants submit claim 9 is allowable; claims 11 and 15 are allowable for depending from an allowable base claim.

Appellants therefore respectfully request that the Board of Patent Appeals and Interferences reverse the Examiner's decision rejecting claims 9-16 and direct the Examiner to pass the case to issue.

The Examiner is hereby authorized to charge the appeal brief fee of **\$540.00** and any additional fees which may be necessary for consideration of this paper to Kenyon & Kenyon Deposit Account No. **11-0600**.

Respectfully submitted,

KENYON & KENYON LLP

Date: November 17, 2008

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APPENDIX

(Brief of Appellants Naoto MATONO
U.S. Patent Application Serial No. 10/802,596)

8. CLAIMS ON APPEAL

The claims in their current form (including those claims under appeal) are presented below:

1-8. (Cancelled).

9. (Previously Presented) A method of manufacturing a thin film magnetic head comprising:

providing first and second magnetic layers magnetically coupled to each other and having first and second pole tip portions placed so as to face a recording medium in conjunction with being in contact with a gap layer and being opposed to each other as sandwiching the gap layer;

providing a thin film coil disposed in a space between the first and second magnetic layers; and

providing a first insulating layer, sandwiched between a second and a third insulating layer, embedding the thin film coil in the space between the first and second magnetic layers,

providing a trim structure comprising a portion of the first magnetic layer and a portion of the second magnetic layer in direct contact with a portion of the gap layer;

wherein the method further comprises:

forming the gap layer with a non-magnetic conductive material; and

forming at least the first pole tip portion on the gap layer by growing a plating film with the gap layer used as an electrode and wherein the first magnetic layer including the

first pole tip portion is formed of the plating film as a single layer.

10. (Original) A method of manufacturing a thin film magnetic head according to claim 9, further including a step of selectively etching the gap layer through ion milling by using at least the first pole tip portion as a mask and, subsequently, selectively etching the second magnetic layer to predetermined depth.

11. (Previously Presented) A method of manufacturing a thin film magnetic head according to claim 9, wherein an etching speed through ion milling of said non-magnetic conductive material is within a range extending from being higher than 0.5 times to being no more than 2 times of an etching speed on the second magnetic layer.

12. (Cancelled).

13. (Original) A method of manufacturing a thin film magnetic head according to claim 9, wherein one out of a group consisting of copper, chromium, tantalum, aluminum, gold, niobium, tungsten, ruthenium, molybdenum, beryllium, nickel copper, nickel chromium, nickel phosphorus and beryllium copper, or an alloy including at least the one out of the group is used as the non-magnetic conductive material.

14. (Original) A method of manufacturing a thin film magnetic head according to claim 10, wherein one out of a group consisting of copper, chromium, tantalum, aluminum, gold, niobium,

15. tungsten, ruthenium, molybdenum, beryllium, nickel copper, nickel chromium, nickel phosphorus and beryllium copper, or an alloy including at least the one out of the group is used as the non-magnetic conductive material.

16. (Original) A method of manufacturing a thin film magnetic head according to claim 11, wherein one out of a group consisting of copper, chromium, tantalum, aluminum, gold, niobium, tungsten, ruthenium, molybdenum, beryllium, nickel copper, nickel chromium, nickel phosphorus and beryllium copper, or an alloy including at least the one out of the group is used as the non-magnetic conductive material.

16-24. (Cancelled).

9. EVIDENCE APPENDIX

No further evidence has been submitted with this Appeal Brief.

10. RELATED PROCEEDINGS APPENDIX

Per Section 2 above, there are no related proceedings to the present Appeal.